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EXAMINER	
WEINTROP, ADAM S	

ART UNIT	PAPER NUMBER
2109	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/633,104	EMMOT, DAREL	
	Examiner	Art Unit	
	Adam S. Weintrop	2109	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/5/03, 8/1/03*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. **Claims 1-20** are objected to because of the following informalities:

Regarding **claim 1**, the term "the plurality of nodes" on claim line 2 should be replaced with --the plurality of distributed switching nodes-- to clarify the claim language. The term "the node" on claim line 3 should be replaced with --the at least one of the plurality of distributed switching nodes--. The phrase "one of the other channels" on claim line 9 should be replaced with --the one of the plurality of other channels-- to improve the clarity of the claim.

Regarding **claim 4**, the term "a remaining communication length" on claim lines 1-2 should be replaced with --the remaining communication length-- to improve the clarity of the claim.

Regarding **claim 17**, the term "the plurality of nodes" on claim line 2 should be replaced with --the plurality of distributed switching nodes-- to clarify the claim language. The term "the node" on claim line 3 should be replaced with --the at least one of the plurality of distributed switching nodes--. The term "information" on claim line 5 should be replaced with --the information--. The term "a information" on claim line 7 should be replaced with --the information--. The phrase "the first channel" on claim line 9 should be replaced with --of the first channel-- to improve the clarity of the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 2, 7, and 18** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **claims 2, 7, and 18,** the term "information" is vague as to what it refers to and comprises of. It is unclear as to which piece of "information" is used here, as there are multiple uses and types of the word "information" in independent claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-4, 7-9, 12, 17-18, and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittia et al. (US 6,826,186) in view of Perlman et al. (US 5,243,592).

Regarding **claims 1 and 17**, Dittia et al. discloses in a multi-node network comprising a plurality of distributed switching nodes (column 1, line 67-column 2, line 7, with the interconnection elements seen as switching nodes for selecting a path), a method implemented in at least one of the plurality of nodes for routing information

entering the node over a first channel to one of a plurality of other channels, or out of the node over a first channel from one of a plurality of other channels (column 2, lines 27-31, with routing over multiple paths is seen as routing in a node from a first channel to one of a plurality of other channels or from a plurality of other channels to a first channel and Figure 3B, with multiple paths entering a node and multiple paths leaving a node, and the system is responsible for routing to and from these paths), the method comprising:

obtaining priority information for the information (column 6, lines 8-19, with the distribution of information routing is determined on service type, which can comprise a service priority, seen as obtaining a priority from the information to be routed); determining a current demand for each of the plurality of other channels (column 9, line 61-column 10, line 2, where each destination has a specific output buffer, and the buffer length is used in routing determination, seen as determining a current demand for the output channel); and routing the information entering at the first channel to one of the other channels based upon an evaluation that considers a combination of the obtained priority information, and the current demand for each of the plurality of other channels (column 9, line 61-column 10, line 7, with the device placing certain priority data into a specific output buffer, and the buffer lengths are also used to determine routing destinations, seen as using a combination of current demand for the channel and priority information to determine routing destinations).

Dittia et al. does not disclose ascertaining a remaining communication length for the information for each of the plurality of other channels and then using that information is

combination with the other information to determine routing. The general concept of determining path length and using that to determine routing is well known in the art as illustrated by Perlman et al. Perlman et al. describes a system that uses distance vectors to provide routers with information regarding communication lengths, and then routing information using this distance determination (column 5, line 55-column 6, line 1, with the routers determining communication lengths for distances from source and destination and then using that information to route information on the most efficient path).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. with using communication length determination and then using that factor to assist with routing the information as taught by Perlman et al. in order to incorporate the commonly used distance vector routing algorithm as to make the most efficient routing path determination as noted in Perlman et al.'s disclosure in column 5, lines 42-45.

Regarding **claims 2 and 18**, Dittia et al. and Perlman et al. teach all of the limitations as described above, with Dittia et al. further teaching the method of claim 1 or claim 17 further comprising determining a demand for channels coupled to remote nodes between a current node and a destination node and utilizing this information in determining a channel over which to route the information (column 9, line 61-column 10, line 7, with the device placing certain output data into a specific output buffer, and the buffer lengths are also used to determine routing destinations, seen as using current

demand for the channel from the current node to remote nodes to determine routing output channels).

Regarding **claim 3**, Dittia et al. and Perlman et al. teach all of the limitations as described above, with Dittia et al. further teaching the method of claim 1 further comprising obtaining a destination node from a header portion of the information (column 8, lines 15-20, with routing path information being included in the header portion of the data, and then used to determine the route, seen as including a next destination node in a header portion of the information).

Regarding **claim 4**, Dittia et al. and Perlman et al. teach all of the limitations as described above, however Dittia et al. does not disclose ascertaining a quantifiable identification of a number of intermediate nodes that the information will traverse before reaching its destination as part of the ascertaining remaining communication length step. The general concept of determining a number of intermediate nodes before a destination node and then use this information for routing purposes is well known in the art as illustrated by Perlman et al. Perlman et al. describes a system that uses distance vectors to provide routers with information regarding communication lengths, and then routing information using this distance determination (column 5, line 55-column 6, line 1, with the routers determining communication lengths for distances from source and destination and then using that information to route information on the most efficient path). Perlman et al. describes a distance vector and shows that it includes the number if intermediate nodes before a destination node (Figure 2a). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. with using

communication length determination with quantifiable numbers of intermediate nodes and then using that factor to assist with routing the information as taught by Perlman et al. in order to incorporate the commonly used distance vector routing algorithm as to make the most efficient routing path determination as noted in Perlman et al.'s disclosure in column 5, lines 42-45.

Regarding **claim 7**, Dittia et al. and Perlman et al. teach all of the limitations as described above, however Dittia et al. does not disclose receiving and evaluating information from other nodes on the network as part of the ascertaining remaining communication length step. The general concept of receiving information from other nodes on the network and then using this information for routing purposes is well known in the art as illustrated by Perlman et al. Perlman et al. describes a system that uses distance vectors to provide routers with information regarding communication lengths, and then routing information using this distance determination (column 5, line 55-column 6, line 1, with the routers determining communication lengths for distances from source and destination and then using that information to route information on the most efficient path). Perlman et al. describes a distance vector is sent around the network nodes to build the network's neighbor list (column 5, lines 55-59, with the distance vector being passed around from node to node to build the neighbor list in order to more efficiently route). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. with receiving information passed from other nodes to assist with routing the information as taught by Perlman et al. in order to incorporate the commonly used distance vector routing algorithm as to make the most

efficient routing path determination as noted in Perlman et al.'s disclosure in column 5, lines 42-45.

Regarding **claim 8**, Dittia et al. and Perlman et al. teach all of the limitations as described above, however Dittia et al. does not disclose ascertaining the remaining communication length based on a priori information. The general concept of evaluating a priori knowledge to determine communication lengths is well known in the art as illustrated by Perlman et al. Perlman et al. describes a system that uses distance vectors to provide routers with information regarding communication lengths, and then routing information using this distance determination (column 5, line 55-column 6, line 1, with the routers determining communication lengths for distances from source and destination and then using that information to route information on the most efficient path). Perlman et al. describes a distance vector is sent around the network nodes to build the network's neighbor list (column 5, lines 55-59, with the distance vector being passed around from node to node to build the neighbor list in order to more efficiently route). Each router has no knowledge of the nodes passed the immediate neighboring nodes until a distance vector is passed to it (column 5, lines 49-55). This is seen as using a priori knowledge to determine communication lengths since a router receives knowledge of the network topology upon receipt of the distance vectors and this information comprises communication lengths. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. with receiving a priori knowledge passed from other nodes to assist with routing the information as taught by Perlman et al. in order to incorporate the commonly used distance vector

routing algorithm as to make the most efficient routing path determination as noted in Perlman et al.'s disclosure in column 5, lines 42-45.

Regarding **claim 9**, Dittia et al. and Perlman et al. teach all of the limitations as described above, with Dittia et al. further teaching the method of claim 1 wherein the determining the current demand for each of the plurality of other channels comprises evaluating a state of an output queue for each of the other channels (column 9, line 61-column 10, line 7, with the device placing certain output data into a specific output buffer, and the buffer lengths are also used to determine routing destinations, seen as using current demand for the channel based on the output queue state for determining the demand for each of the other channels).

Regarding **claim 12**, Dittia et al. and Perlman et al. teach all of the limitations as described above, with Dittia et al. further teaching the method of claim 1, wherein the information is embodied in a packet (column 2, lines 28-31, where the system is used for routing packets).

Regarding **claim 21**, Dittia et al. discloses a node for routing information entering the node over a first channel to one of a plurality of other channels in a multi-node network (column 2, lines 27-31, with routing over multiple paths is seen as routing in a node from a first channel to one of a plurality of other channels) comprising a plurality of distributed switching nodes (column 1, line 67-column 2, line 7, with the interconnection elements seen as switching nodes for selecting a path), the node comprising: logic configured to obtain priority information for the information (column 6, lines 8-19, with the distribution of information routing is determined on service type, which can comprise

a service priority, seen as obtaining a priority from the information to be routed); logic configured to determine a current demand for each of the plurality of other channels (column 9, line 61-column 10, line 2, where each destination has a specific output buffer, and the buffer length is used in routing determination, seen as determining a current demand for the output channel); and logic configured to route the information entering at the first channel to one of the other channels based upon an evaluation that considers a combination of the obtained priority information, and the current demand for each of the plurality of other channels (column 9, line 61-column 10, line 7, with the device placing certain priority data into a specific output buffer, and the buffer lengths are also used to determine routing destinations, seen as using a combination of current demand for the channel and priority information to determine routing destinations).

Dittia et al. does not disclose logic configured to ascertain a remaining communication length for the information for each of the plurality of other channels and then using that information is combination with the other information to determine routing. The general concept of determining path length and using that to determine routing is well known in the art as illustrated by Perlman et al. Perlman et al. describes a system that uses distance vectors to provide routers with information regarding communication lengths, and then routing information using this distance determination (column 5, line 55-column 6, line 1, with the routers determining communication lengths for distances from source and destination and then using that information to route information on the most efficient path).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. with using communication length determination and then using that factor to assist with routing the information as taught by Perlman et al. in order to incorporate the commonly used distance vector routing algorithm as to make the most efficient routing path determination as noted in Perlman et al.'s disclosure in column 5, lines 42-45.

6. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Dittia et al. (US 6,826,186) in view of Perlman et al. (US 5,243,592) as applied to claim 1 above, and further in view of Gross et al. (US 6,765,905).

Regarding **claim 5**, Dittia et al. and Perlman et al. teach all of the limitations as described above except for retrieving priority information from the header portion of the information. The general concept of retrieving priority information from a header portion of information to determine routing priority is well known in the art as illustrated by Gross et al. Gross et al. describes a routing system where the routes are determined based on priority retrieved from the header portion (column 1, lines 28-32 and lines 42-44, where each queue is setup based on priority information retrieved from the header). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. and Perlman et al. with retrieving priority information from the header of information as taught by Gross et al. in order to create less routing delay in priority packets, thus increasing the quality of service as noted in Gross et al.'s disclosure in column 1, lines 45-52.

7. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Dittia et al. (US 6,826,186) in view of Perlman et al. (US 5,243,592) as applied to claim 1 above, and further in view of Knappe (US 6,922,396).

Regarding **claim 6**, Dittia et al. and Perlman et al. teach all of the limitations as described above except for retrieving priority information by evaluating the payload portion of the information. The general concept of evaluating priority information by examining the payload portion of information is well known in the art as illustrated by Knappe. Knappe describes a routing system where congestion control is optimized and priority packets are determined by examining the type of information represented by data in the packet (column 9, lines 1-5, where priority depends on the type of data in the data portion of the packet, seen as the payload portion). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. and Perlman et al. with retrieving priority information from the payload portion as taught by Knappe in order to improve congestion control for certain types of data streams, such as voice, as noted in Knappe's disclosure in column 2, lines 34-40.

8. **Claims 10-11, 19-20, and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittia et al. (US 6,826,186) in view of Perlman et al. (US 5,243,592) as applied to claims 1, 17, and 21 above, and further in view of Raciborski et al. (US 6,658,000).

Regarding **claims 10-11, 19-20, and 22**, Dittia et al. and Perlman et al. teach all of the limitations as described above except for using a balanced weighting of the routing factors of priority, length, and demand as required by claims 10, 19, and 22, or

using a unbalanced weighting of the routing factors of priority, length, and demand as required by claims 11 and 20. The general concept of using a balanced of an unbalanced weighting of routing factors is well known in the art as illustrated by Raciborski et al. Raciborski et al. describes a system where the routing of content over multiple data paths is determined by a multitude of network diagnostics (column 1, lines 50-52 and column 20, lines 35-40, where routing is performed from a client to a server, seen as a source and a destination, over a plurality of paths using a list of factors). Raciborski et al. teaches that these factors used in determining the route can be balanced equally together or unbalanced together (column 22, lines 52-59 and column 23, lines 14-18, where the methodologies to determine routing are weighted differently to alter the result returned). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. and Perlman et al. with using an unbalanced or balanced weighting of routing factors to determine the route from a source to a destination as taught by Raciborski et al. in order to stream large content objects of data by determining optimal routing paths as noted in Raciborski et al.'s disclosure in column 1, lines 29-31.

9. **Claims 13-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Dittia et al. (US 6,826,186) in view of Perlman et al. (US 5,243,592) as applied to claim 1 above, and further in view of "Wormhole Routing Techniques for Directly Connected Multicomputer Systems" (Mohapatra).

Regarding **claims 13-16**, Dittia et al. and Perlman et al. teach all of the limitations as described above except for routing information when the information is

embodied in a flit as required by claim 13, a plurality of flits which collectively comprise a information packet as required by claim 14, where the routing is performed on a per-flit basis as required by claim 15, or where the routing is performed on a first flit, and the remaining flits in a packet follow the same channel selected as required by claim 16. The general concept of routing flits in this way is well known in the art as illustrated by Mohapatra. Mohapatra describes wormhole routing. Wormhole routing is performed on networks using flits, which comprise an entire packet (page 380, first column, lines 24-27). The first flit received contains the header information so it is routed first, and the other flits follow the header flit over the same path (page 380, first column, lines 28-36, where the header flit is routed using the router information, and the others are routed in the same path, seen as routing on a per-flit basis and having the remaining flits follow in the same channel as the first flit). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Dittia et al. and Perlman et al. with using flit routing and wormhole routing techniques as taught by Mohapatra in order to create a more efficient data flow by using the pipelined technique as noted in Mohapatra's disclosure on page 380, second column, lines 11-18.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam S. Weintrop whose telephone number is 571-270-1604. The examiner can normally be reached on Monday through Friday 7:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AW 5/2/07

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SUPERVISORY PATENT EXAMINER